

Application number 10/635,561  
Response to office action mailed Oct 03, 2006

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

We claim:

1. (Currently amended) A method for selective payload cancellation in an optical communication system (OCS), including an Intensity Modulator for selectively controlling the intensity of payload of the OCS, the method comprising steps of:

extracting and processing signal from an input of the Intensity Modulator;  
extracting and processing signal from an output of the Intensity Modulator;  
estimating amplitude and phase of a frequency band in a payload to be cancelled by a Digital Signal Processing and Control Unit (DSPCU);  
producing output signals of said DSPCU using the extracted and processed signals from the input and the output of the Intensity Modulator, and the estimated amplitude and phase of the frequency band in the payload to be cancelled; and  
generating a cancellation signal using the output signals produced by the DSPCU ~~and the extracted and processed signal from the input of the Intensity Modulator,~~ and canceling the frequency band in the payload to be cancelled.

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2. (original) A method as claimed in claim 1, wherein the step of extracting and processing signal from the input of the Intensity Modulator comprises the steps of:
  - tapping input payload signal at the input of the Intensity Modulator;
  - converting the tapped input payload signal into input electrical signal using an optical to electrical converter; and
  - processing said input electrical signal.
3. (original) A method as claimed in claim 1, wherein the step of extracting and processing signal from the output of the Intensity Modulator comprises the steps of:
  - tapping output payload signal at the output of the Intensity Modulator;
  - converting the tapped output payload signal into output electrical signal using an optical to electrical converter; and
  - processing said output electrical signal.
4. (original) A method as claimed in claim 1, wherein the step of estimating amplitude and phase of the frequency band in the payload to be cancelled comprises the steps of:
  - extracting the amplitudes and phases of spectral

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components of the frequency band in the payload to be cancelled using a DFT (Digital Fourier Transform) of the processed output electrical signal using an Amplitude and Phase Estimator within the DSPCU; and

computing an effective amplitude and phase for each spectral component of the frequency band in the payload to be cancelled by the DSPCU.

5. (original) A method as claimed in claim 1, wherein the step of producing the output signals of the DSPCU comprises the steps of:

generating a variable gain control signal by an Adaptive Variable Gain Control Unit in the DSPCU as a first output signal of the DSPCU;  
generating a variable phase delay control signal by an Adaptive Phase Control Unit in the DSPCU as a second output signal of the DSPCU; and  
generating a third output signal by the DSPCU for processing the output electrical signal.

6. (original) A method as claimed in claim 2, wherein the step of processing the input electrical signal comprising the steps of:

amplifying the input electrical signal in accordance with the first output signal produced by the DSPCU;  
and

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filtering the amplified signal for extracting the frequency band in the payload to be cancelled by applying a high order linear band-pass filter.

7. (original) A method as claimed in claim 1, wherein the step of generating the cancellation signal and canceling the frequency band in the payload to be cancelled comprises the steps of:

phase matching the input payload signal at the Intensity Modulator and the cancellation signal applied to the Intensity Modulator by a Variable Phase Delay unit, using the second output signal produced by the DSPCU and the extracted and processed input signal; and  
applying the cancellation signal through a driver to the Intensity Modulator for selectively controlling the intensity of the payload and removing the frequency band to be canceled in the payload.

8. (original) A method as claimed in claim 3, wherein the step of processing the output electrical signal comprises the steps of:

amplifying the tapped output payload signal in accordance with the third output signal produced by the DSPCU;  
filtering the amplified signal for extracting the frequency band in the payload to be cancelled by

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applying the high order linear band-pass filter; and

converting the filtered output from analog to digital by an Analog to Digital Converter (ADC) for the digital processing performed by the DSPCU.

9. (Currently amended) A system for selective payload cancellation in an optical communication system (OCS), including an Intensity Modulator for selectively controlling the intensity of payload of the OCS, the system comprising:

means for extracting and processing signal from an input of the Intensity Modulator;

means for extracting and processing signal from an output of the Intensity Modulator;

a Digital Signal Processing and Control Unit (DSPCU) for estimating amplitude and phase of a frequency band in a payload to be cancelled and for producing output signals using the extracted and processed signals from the input and the output of the Intensity Modulator, and the estimated amplitude and phase of the frequency band in the payload to be cancelled;; and

means for generating a cancellation signal using the output signals produced by the DSPCU, ~~and the extracted and processed signal from the input of the Intensity Modulator.~~

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10. (original) A system as claimed in claim 9,  
wherein the means for extracting and processing signals  
at the input of the Intensity Modulator, comprises:  
an input optical tap for tapping input payload  
signal at the input of the Intensity Modulator;  
an optical to electrical converter for converting  
the tapped input payload signal into input  
electrical signal; and  
means for processing said input electrical signal.

11. (original) A system as claimed in claim 9,  
wherein the means for extracting and processing signals  
at the output of the Intensity Modulator, comprises:  
an output optical tap for tapping output payload  
signal at the output of the Intensity Modulator;  
an optical to electrical converter for converting  
the tapped output payload signal into output electrical  
signal; and  
means for processing said output electrical signal.

12. (original) A system as claimed in claim 9,  
wherein the DSPCU comprises:  
an Amplitude and Phase Estimator for estimating a  
frequency band in the payload to be cancelled;  
an Adaptive Variable Gain Control Unit for  
generating a variable gain control signal as a first

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output signal of the DSPCU; and  
an Adaptive Phase Delay Control Unit for generating  
a phase delay control signal as a second output of  
the DSPCU.

13. (original) A system as claimed in claim 12,  
wherein the Amplitude and Phase Estimator comprises:  
means for extracting the amplitudes and phases of  
the spectral components of the frequency band in the payload  
to be cancelled  
using a DFT (Digital Fourier Transform) of the  
processed output electrical signal; and  
means for computing an effective amplitude and phase  
for each spectral component of the frequency band in the  
payload to be cancelled.

14. (original) A system as claimed in claim 10,  
wherein the means for processing the input electrical  
signal comprises:  
an amplifier for amplifying the input electrical  
signal in accordance with the first output signal  
produced by the DSPCU; and  
a high order linear band-pass filter for filtering  
the frequency band in the payload to be cancelled.

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15. (original) A system as claimed in claim 9, wherein the means for generating the cancellation signal comprises:

a Variable Phase Delay unit for phase matching the input payload signal at the Intensity Modulator and the cancellation signal applied to the Intensity Modulator, using the second output signal produced by the DSPCU and the extracted and processed input signal; and  
a driver for applying the cancellation signal to the Intensity Modulator for selectively controlling the intensity of the payload and removing the frequency band to be canceled in the payload.

16. (original) A system as claimed in claim 11, wherein the means for processing the output electrical signal comprises:

an amplifier for amplifying the output electrical signal in accordance with a third output signal produced by the DSPCU;  
a high order linear band-pass filter for extracting the frequency band in the payload to be cancelled;  
and  
an Analog to Digital Converter (ADC) for converting the analog signal at the output of said high order linear band-pass filter to digital for the digital processing performed by the DSPCU.